

--JP,06-027550,B---Examined patent application publication

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.
4. The translation in Brief Description of the Drawings is partially corrected by J. ANDO.

[Claim(s)]

[Claim 1] The fluid stopper characterized by to consist of the flexible object which performs pinch-and-swell actuation with the pressure of a fluid, and the shell which has the part which broke so that an end might be connected with this flexible object and it might be easy to be crooked in halfway, and attached the peculiarity, to make the part which attached the chip box peculiarity of said shell by pinch-and-swell actuation of said flexible object by the pressure of said fluid crooked, and to control circulation of a fluid.

[Detailed Description of the Invention]

[Industrial Application]

In the fluid channel which circulates air, water, an oil, and a fluid like a drug solution, this invention relates to the simple fluid stopper which stops circulation of a fluid temporarily or restricts a flow rate, when the pressure of a fluid becomes more than place constant pressure or the following.

[Description of the Prior Art]

In the former, the case where this valve is controlled by the signal from a pressure detection means to furnish a valve into a fluid channel, for example, to detect the pressure of a fluid is common as a means to stop circulation of a fluid or to restrict a flow rate usual.

[Problem(s) to be Solved by the Invention]

In such a case, while a quite large-scale facility of a pressure detection means to detect the pressure of a fluid, the valve installed into a fluid channel, the control unit which controls this valve further is needed and cost

becomes high, there is a problem of this attachment location being restrained. The purpose of this invention is to offer the fluid stopper which was made to perform a halt of circulation of a fluid, and a limit of a flow rate by the very simple configuration automatically.

[The means for solving a technical problem]

In the fluid stopper applied to this invention in order to attain the above-mentioned purpose An end is connected with the flexible object which performs pinch-and-swell actuation with the pressure of a fluid, and this flexible object. It is characterized by consisting of the shell which has the part which broke so that it might be easy to be crooked in halfway, and attached the peculiarity, making the part which attached the chip box peculiarity of said shell by pinch-and-swell actuation of said flexible object by the pressure of said fluid crooked, and controlling circulation of a fluid.

[Function]

With the pressure of a fluid, a flexible object expands or contracts, the part fallen into the chip box habit of a shell by the actuation is crooked, and the fluid stopper which has the above-mentioned configuration performs a halt of circulation of a fluid by the degree of the crookedness, or a limit of a flow rate.

[Example]

This invention is explained to a detail based on the example of illustration.

Fig. 1 and Fig. 2 show the example of the fluid stopper concerning this invention, and, as for the condition that, as for Fig. 1, the fluid is circulating, and Fig. 2, circulation of a fluid shows the condition that a halt or a flow rate is restricted. The bellows of the shape of a cartridge which sets on a drawing, and expands or contracts 1 with the pressure of an internal fluid, and 2 are tubes which have the flexibility connected with bellows 1. In order to make it easy to be beforehand crooked in this tube 2, two parts 3 and 3 in which it broke into as shown in Fig. 3, and the peculiarity was prepared, i.e., flections, are established.

As it is indicated in Fig. 1 as bellows 1 and a tube 2, you may fabricate to one, or what was fabricated on another object as shown in Fig. 4 may be combined. Although these quality of the materials change with applications, generally things which combined these, such as synthetic resin, rubber, and [with good resiliency, endurance, and temperature stability] a metal, are used.

In Fig. 1 and Fig. 2, in the usual condition which shows bellows 1 and a tube 2 in Fig. 1 when it fixes to frame 4 grade, respectively, bellows 1 will be

contracted, and since the flection 3 is not crooked to the degree which bars circulation of an internal fluid, the fluid is circulating the inside of bellows 1 and a tube 2. However, if the pressure of an internal fluid becomes more than place constant pressure, since bellows 1 expands as shown in Fig. 2, the flection 3 of a tube 2 will be crooked in the degree of pole, circulation of an internal fluid will stop completely by the degree of the crookedness, or a flow rate will be restricted.

Since clearance 2a is made to both sides even when the case where Fig. 5 had illustrated the cross section in the condition of having made the flection 3 crooked, (a) folded only the center section, and a peculiarity is attached is shown and you make it crooked extremely, circulation of a fluid cannot be stopped completely. However, as shown in (b), when it breaks into the whole and a peculiarity is attached, it can stop completely. Thus, what is necessary is just to choose these also as the condition of making it a half-aperture and restricting a flow rate also to the condition of having closed completely, depending on how attaching the degree of crookedness of a flection 3, and a chip box peculiarity, suitably according to an application. Moreover, if bellows 1 is arranged to the upstream and a tube 2 may be arranged to the downstream in a fluid channel, also when [ that ] arranging conversely, it is. In addition, bellows 1 will be made into the source of constant pressure when a fluid is flowed from a tube 2 side.

If the case where bellows 1 and a tube 2 are held in the interior of a case 5 is shown and the internal pressure of bellows 1 becomes high rather than the place constant pressure in the case 5 around bellows 1, a flection 3 will close Fig. 6 and it will no longer be supplied to a tube 2 side.

Moreover, Fig. 7 shows the example which held the tube 2 in the interior of the bellows 1 which fixed the end. In this case, if the internal pressure of bellows 1 becomes low to the internal pressure of a case 5, as a result of bellows's 1 contracting, a flection 3 closes and a fluid is no longer supplied to a tube 2 side.

Although the above-mentioned example showed the case where a flection 3 was formed in two places to the tube 2, only one place may be prepared, as it is not necessarily limited to two places, for example, is shown in Fig. 8. In Fig. 8, as for (a), the condition that the tube 2 is not crooked, and the condition that bellows 1 expanded, the flection 3 was crooked and (b) has barred circulation of a fluid are shown.

Moreover, Fig. 9 connects the tube 2 which has a flection 3 between two bellows 1a and 1b, and shows the example which makes a flection 3 crooked by expansion or contraction actuation of Bellows 1a and 1b.

Since only a flection 3 can be made thin or it can be made thin meat, as it is shown in Fig. 10, in order to make crookedness of a flection 3 easy, and a degree of freedom is given towards crookedness, it is also possible to change the include angle of the crookedness direction of two or more flections 3, as shown in Fig. 11. Furthermore, as shown in Fig. 12, it is also effective in the outside or the inside of a tube 2 to insert in the crookedness auxiliary member 6 for promoting crookedness as shown in Fig. 13. This crookedness auxiliary member 6 connects short pipe section 6a by pellicle-like connection section 6b, and the center section of connection section 6b is made to be crooked, and it may prepare fold 6c in the center section of connection section 6b if needed.

Fig. 14 shows the example bellows 1 expands and it was made for a flection 3 not to close, unless it forms a spring 7 in the direction which bars expansion of bellows 1 and the pressure in bellows 1 becomes quite high. A spring can also be used in the direction which promotes expansion of bellows 1 conversely depending on the case.

In the example shown in Fig. 15, a tube 2 is attached in one side face of the bellows 1 expanded and contracted in the shape of a sector, and the example which makes the flection 3 crooked according to the opening of bellows 1 is shown. Of course, the end of a tube 2 is opened for free passage inside bellows 1. Also in this case, as an arrow head S shows, a spring etc. can be prepared in the direction which bars expansion of bellows 1.

Fig. 16 attaches a tube 2 in the interior of the bellows 1 of the shape of same sector, and when bellows 1 contracts, it shows the example it was made to make the flection 3 of a tube 2 crooked.

Fig. 17 holds the flection 3 of a tube 2 in the interior of the cartridge-like bellows 1, and fixes the free edge of bellows 1 to a tube 2, some tubes 2 are open for free passage inside bellows 1, and it shows the example which prepared Spring-8 in the direction which bellows 1 contracts. In this case, by pushing bellows 1 on Spring-8, always contracting, and closing the flection 3 of a tube 2, although a halt or a flow rate is restricted, when the internal pressure of bellows 1 overcomes the elasticity of Spring-8 and bellows 1 expands, a flection 3 opens circulation of a fluid, and circulation of a fluid is

performed.

Furthermore, since crookedness of a flection 3 is made easy, the knot section 9 of the structure which is easy to be crooked in some places of a tube 2 as shown in Fig. 18 is formed, and it can make it possible to move a tube 2 free. In addition, in an example, although the flexible object explained bellows as an example, it may be a diaphragm etc.

[Effect of the Invention]

When the pressure of a fluid becomes more than place constant pressure or the following in a fluid channel, a flexible object can expand or contract, and the fluid stopper applied to this invention as explained above can be crooked in the flection of a shell by the expansion or contraction actuation, can restrict a halt or a flow rate for circulation of a fluid automatically, and has the advantage that circulation of a fluid is efficiently controllable by the very simple means.

[Brief Description of the Drawings]

A drawing shows the example of the fluid stopper concerning this invention. Fig. 1 is a sectional view of a usual condition of the example, Fig. 2 is a sectional view of a working condition and Fig. 3 is an expanded sectional view of a flection. Fig. 4 is a sectional view of the other example and Fig. 5 is a sectional view of a flection. Each of Figs. 6-9 is a sectional view of the other example and each of Figs. 10-12 is a perspective view of a flection. Fig. 13 is a perspective view of a crookedness auxiliary member. Each of Figs. 14-18 is a sectional view of the other example.

Sign 1 --a bellows

Sign 2 --a tube

Sign 3 --a flection

Sign 4 --a frame

Sign 5 -- a case

Sign 6 --a crookedness auxiliary member

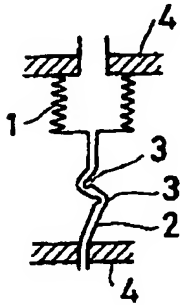
Signs 7, 8 --a spring and

Sign 9 -- a knot section

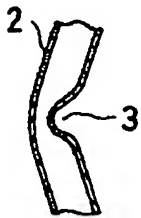
# DRAWINGS

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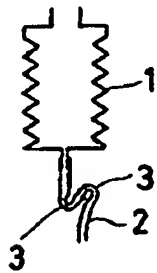
[Fig.1]



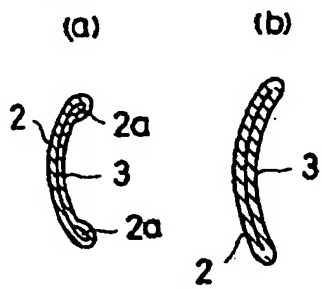
[Fig.3]



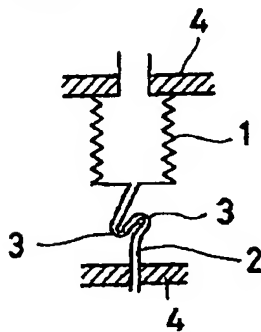
[Fig.4]



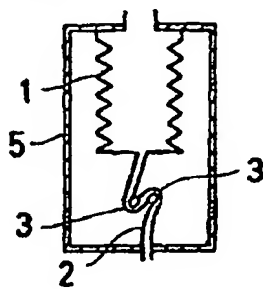
[Fig.5]



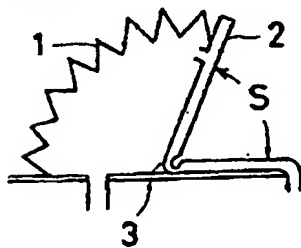
[Fig.2]



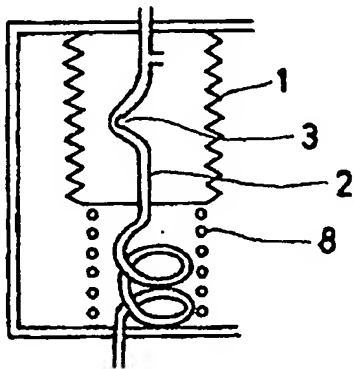
[Fig.6]



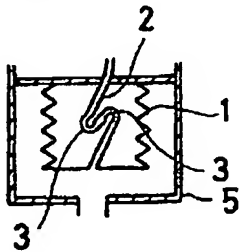
[Fig.15]



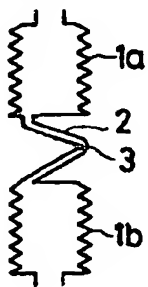
[Fig.17]



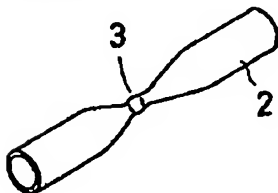
[Fig.7]



[Fig.9]



[Fig.10]

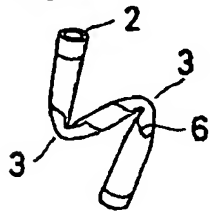




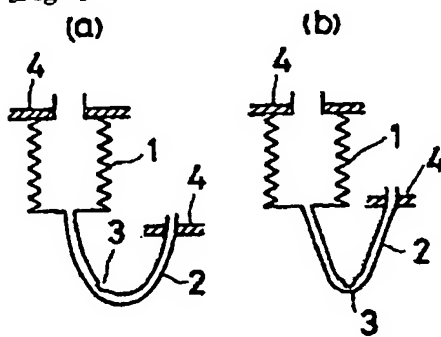
[Fig.11]



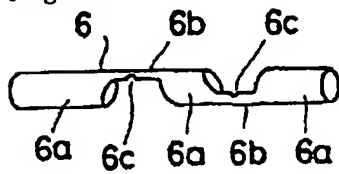
[Fig.12]



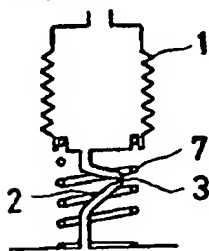
[Fig.8]



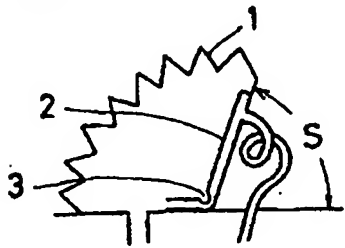
[Fig.13]



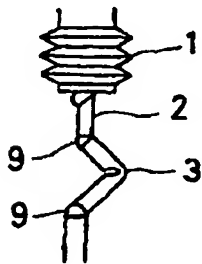
[Fig.14]



[Fig.16]



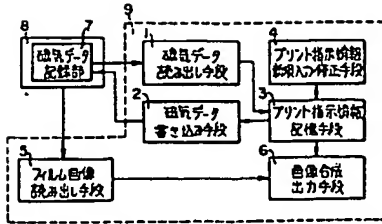
[Fig.18]



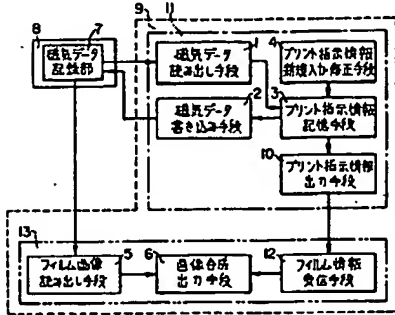




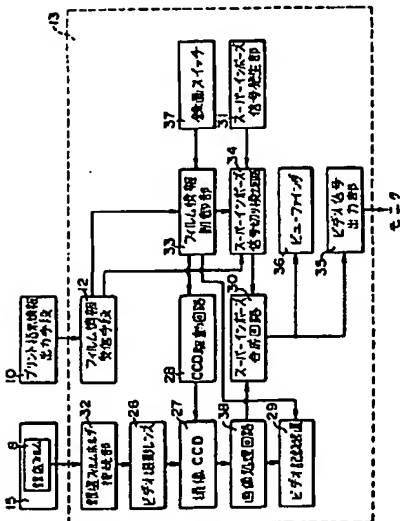
(図1)



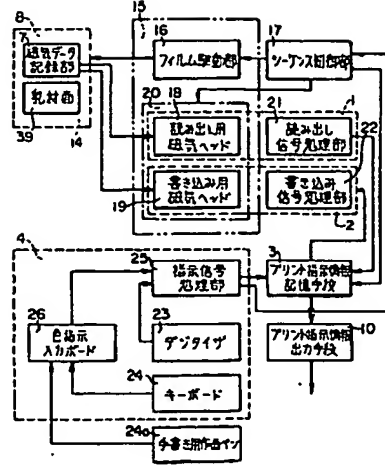
(図2)



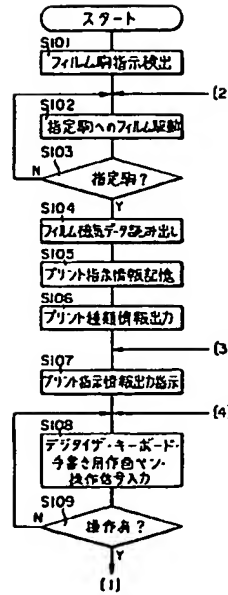
(図4)



(図3)



(図5)



(図6)

